

WE CLAIM:

2 1. A pressure sensor, comprising:
an optical fiber emitting a light beam;
4 a beam to respond to changes in pressure;
a substrate having a first surface on which said beam is mounted and having a second surface
6 opposite said first surface, said substrate defining an opening which is open from said
second surface of said substrate, said optical fiber being mounted in said opening in
8 said substrate to direct said light beam onto said beam; and
a junction in said substrate to receive a portion of said light beam which impinges said beam
10 to drive said beam into vibration.

12 2. A pressure sensor as claimed in claim 1, further comprising:
a shell on said first surface of said substrate enclosing said beam, said shell having an
14 evacuated interior space.

16 3. A pressure sensor as claimed in claim 1, wherein said optical fiber is positioned to
direct said light beam through said junction prior to impinging said beam.

18 4. A pressure sensor as claimed in claim 1, wherein said substrate includes a layer of
semiconductor on said first surface and a layer of insulator below said layer of
semiconductor.

20 5. A pressure sensor as claimed in claim 1, wherein said beam of light is infra-red
light.

22 6. A method for sensing pressure, comprising the steps of:
directing a beam of light through a junction in a semiconductor substrate and onto a beam;
24 providing an optical resonant cavity between said junction and said beam to impose a
frequency on said beam of light;
26 vibrating said beam by electrostatic attraction between said junction and said beam;
varying a frequency of vibration by said beam by changes in pressure to effect changes in said
28 beam of light; and
sensing said changes in said beam of light.

30 7. A method as claimed in claim 6, further comprising the step of:
providing a evacuated chamber within which said beam is mounted, said evacuated chamber
32 having an outer shell defining an optical resonant cavity between said outer shell and
said beam.

34 8. A method of making a pressure sensor, comprising the steps of:
forming a p-n junction on a first surface of a substrate;
36 forming a microstructure on a substrate over said p-n junction, said microstructure including
a shell and a beam within said shell;
38 evacuating said shell;

forming an opening in a second surface of said substrate; and

40 positioning an optical fiber in said opening so as to direct a beam of light onto said beam and

said p-n junction to thereby charge said p-n junction and drive said beam into

42 vibration;

receiving light reflected from said beam, said light carrying a frequency of an optical resonant

44 cavity formed between said p-n junction and said beam; and

subjecting said shell to pressure to vary said light reflected by said beam.

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